American Megatrends

General Alert Server

User's Guide

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2/28/96

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General Alert watches for error conditions on the computer. General Alert performs one of a number of possible actions when an error occurs.

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Package Contents You should have received:

- a software license agreement,
- the *General Alert Server User's Guide*,
- a diskette with the General Alert software, and
- a warranty registration card.

Technical Support If you need help installing, configuring, or running this software, call American Megatrends technical support at 770-246-8645. You can also send questions to tech support at:

support@american.megatrends.com.

Acknowledgments This manual was prepared by Edward Crowthers and Peter Jarrett.

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770-246-8783	Supports HST and v.42.

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1 Overview

The General Alert Serveris a watchdog program The General Alert Server watches for error conditions on the computer and initiates predetermined actions when an error occurs. General Alert works with any application program that conforms to the Microsoft Windows™ DDE specification.

Works with MegaRAID® When installed in a computer with the American Megatrends MegaRAID PCI SCSI Disk Array controller, General Alert can generate a notification in many different ways. The notification is triggered by a change in status.

American Megatrends supplies the DDE interface between the General Alert module and the MegaRAID Power Console RAID Manager through which Power Console notifies General Alert when an error condition occurs.

Windows NT Configuration General Alert runs in a Windows NT environment with multimedia capability and connectivity through serial communications or a network interface.

Configuring General Alert You can configure the actions that the General Alert Server takes. Some of the actions are:

- broadcasting a failure alert message through a pager,
- executing a program,
- sounding an audible alarm,
- displaying a special icon on the screen,
- executing an SNMP trap*(not yet implemented),*
- sending an email, or
- making an entry in a system log.

DDE

General Alert can be configured to operate with any client program that uses Microsoft Windows DDE (Dynamic Data Exchange) to communicate with the server.

This feature can also be used for notification when using General Alert for error conditions generated by other parts of the server or network.

For additional information about configuring DDE, see page 21.

2 Getting Started

System Requirements General Alert must be executed on a IBM PC/AT®-compatible computer running Microsoft Windows NT v3.x or later.

Versions of General Alert that run under Microsoft Windows 95™ and Microsoft Windows 3.11 will be released at a later date.

Installation Insert the General Alert diskette in the floppy drive. Choose the drive A: (or B:) icon in File Manager. Double-click on

SETUP.EXE

in the list of files on the floppy diskette. Follow the instructions on the screen.

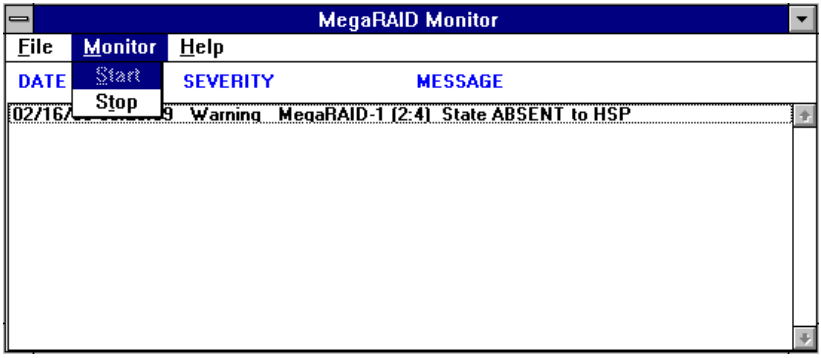
Starting General Alert After completed installation, you can begin using General Alert. Click on the General Alert icon in the General Alert program group.

Using with MegaRAID After General Alert has started, double-click on the Power Console icon in the MegaRAID program group. If you are not running Power Console or do not have a MegaRAID adapter installed in the computer, turn to page 21 for additional instructions.

The MegaRAID Monitor utility includes the DDE code that links General Alert with the MegaRAID Power Console utility. MegaRAID Monitor only works with MegaRAID Power Console.

Cont'd

Starting the MegaRAID Monitor *General Alert must be started before you can register the MegaRAID Monitor.* After Power Console is started, double-click on the MegaRAID Monitor icon in the General Alert program group. Select *Start* from the MegaRAID Monitor menu, shown below:



The start monitor option should now be grayed out. Select Registration from the File menu.

```
RAID Monitor successfully registered
```

should appear. General Alert can now be configured.

Alert Messages MegaRAID Monitor notifies the user if the adapter card changes state. The alert messages are divided into four categories:

- physical drive state changes,
- logical drive state change,
- physical drive is in REBUILD state when monitor is started, and
- logical drive is in non-OPTIMAL state when monitor is started.

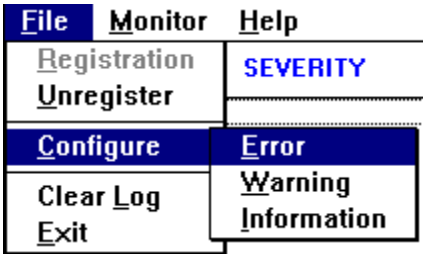
Cont'd

Error Messages The MegaRAID Monitor alert messages can be one of three categories of severity:

- Information (General Alert sends an error message or indicator),
- Warning (General Alert sends a warning message or indicator), and
- Severe (General Alert sends an error message or indicator),

Please see Appendix A on page27 for more information on MegaRAID Monitor error codes.

Configuration Click on Configure in the File menu. The following appears:



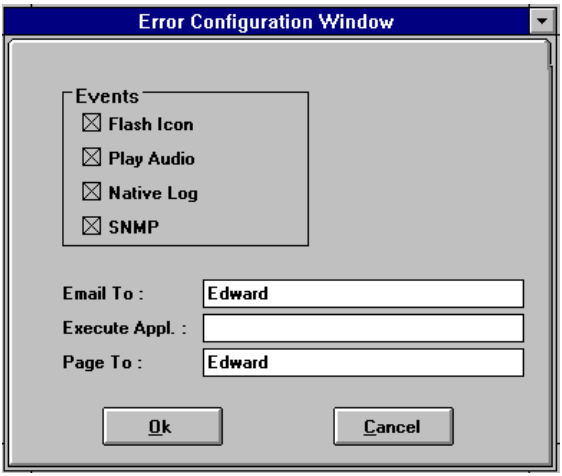
You can change the status of the preconfigured events from this screen. Each event can be configured as:

- Error
- Warning, or
- Information

as decribed above.

Enabling Error Notification Methods

The following appears after you select *Error*, *Warning*, or *Information* from the screen shown on the previous page. You can enable one or more error notification methods.



> ***Important***
> *You must configure the Error Notification method in the General Alert Module before you can enable it from this screen.*

Alert Mechanism	Description
Flashing Icon	Click on the Flash Icon checkbox to instruct General Alert to display a flashing icon on your screen when an error occurs.
Audio	Click on the Play Audio checkbox to instruct General Alert to play the designated .WAV file on your computer speaker when an error occurs.
Native Log	Click on the Native Log checkbox to instruct General Alert to place an entry in the Windows NT Event Log when an error occurs.
SNMP	Click on SNMP to instruct General Alert to send an SNMP message when an error occurs.*This feature is not implemented.*
Email	Enter the email login name of the person to be notified by an email in the Email To: field.
Pager	Enter the name of the person to be paged in the event of an error in the Page To: field.
Execute Program	Enter the complete drive and directory path and filename of the executable program listed in the Program database to be executed in the event of an error in the Execute Appl. field.

MegaRAID MonitorActivities

From the MegaRAID Monitor screen you can:

- register,
- unregister clients, and
- display the MegaRAID event log.

Registration

You only need to choose *Registration* on the File menu when registering General Alert. This task usually is performed only once.

Unregistering

Choose *Unregister* from the File menu to remove the MegaRAID Monitor from the General Alert client database. If using General Alert with MegaRAID and you remove MegaRAID Monitor from the client database, you will not be notified if MegaRAID Power Console determines that there is a problem in the RAID subsystem.

Configure

Choose this option to configure the General Alert elements from MegaRAID Monitor. You can only choose this option if MegaRAID Monitor has been registered.

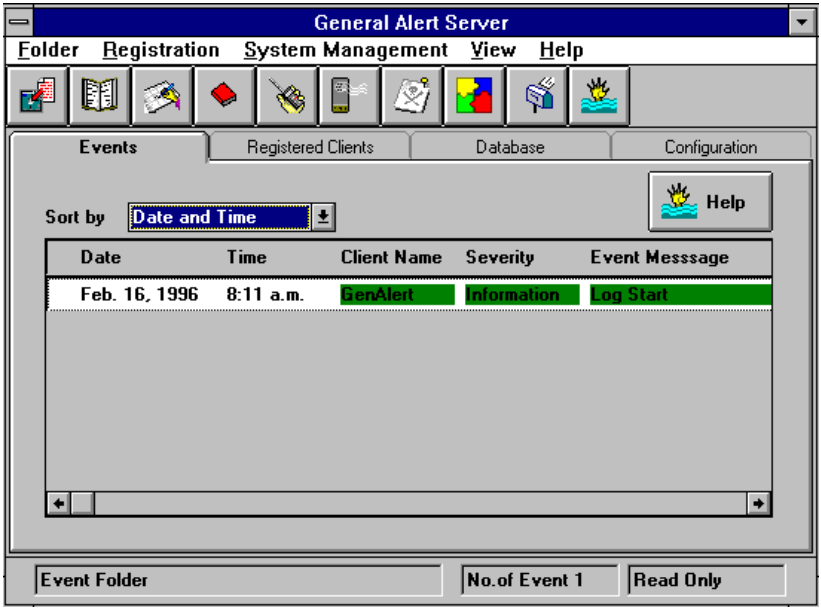
Event Log

The log is displayed at the bottom of the MegaRAID Monitor main menu.

3 Using General Alert

The General Alert main screen is shown below. You can manage the general alert elements, register clients and events, and access the general alert database through this program.

The General Alert module is described in this chapter.



In This Chapter The following topics are discussed in this chapter:

- General Alert elements,
- configuration events, and
- client registration.

General Alert Elements

The mechanisms that General Alert provides in response to alerts received from configured clients are:

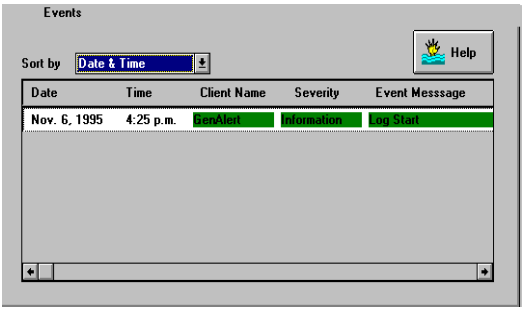
- native log,
- audio notification,
- email,
- flashing icons,
- running a program,
- pager notification, or
- SNMP *(not yet implemented)*.

Native Log

The native log sends the event notification to the Windows NT event viewer in *Administrative Tools*

Event Folder

General Alert displays the information in the Windows NT Event Folder (shown below) for every event notification made by the client application.



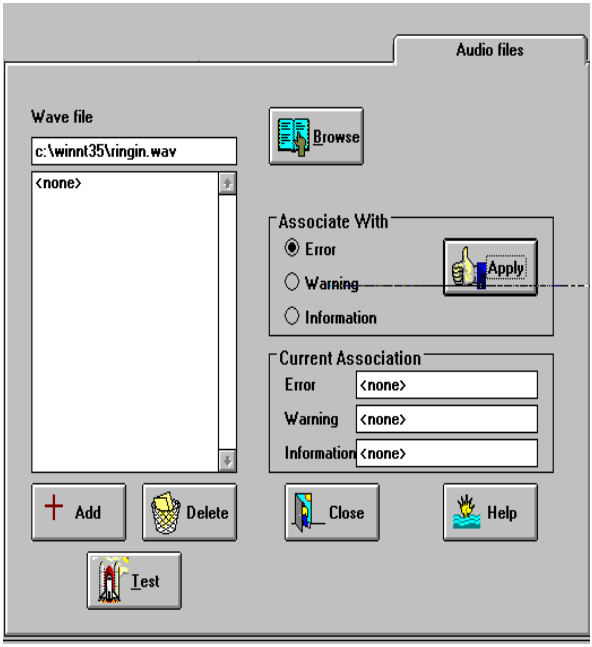
Each row in the log is color-coded, as follows:

Color	Meaning
Red	Errors
Yellow	Warnings
Green	Information

Cont'd

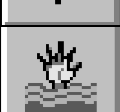
Audio Notification General Alert can play audio (.WAV) files to notify you of an error. Audio notification is configured by clicking on the audio associated icon on the toolbar. The audio database screen is shown below. From the database, you can either enter the name of the audio file or you can click on the browse key and select an audio file.

After selecting a .WAV file , click on the Add button. To associate an audio file with an event, highlight the event to be configured (the name of the audio file must appear in the .WAV File field) and click on Apply. The name of the associated (.WAV) file is displayed next to the event. To listen to an audio file, select the audio file to be played and click on Test. To delete an audio file, select the file and click on Delete.



Cont'd

Toolbar Icons The toolbar icons are explained below.

Icon	Description
	Click on this toolbar icon to save the contents of the current folder.
	Click on this toolbar icon to register a new client.
	Click on this toolbar icon to change the client registration.
	Click on this toolbar icon to unregister a registered client.
	Click on this toolbar icon to access the paging database.
	Click on this toolbar icon to access the audio association database.
	Click on this toolbar icon to access the bitmap association database.
	Click on this toolbar icon to change the default configuration.
	Click on this toolbar icon to display the Email login screen.
	Click on this toolbar icon to display Help screens.

Cont'd

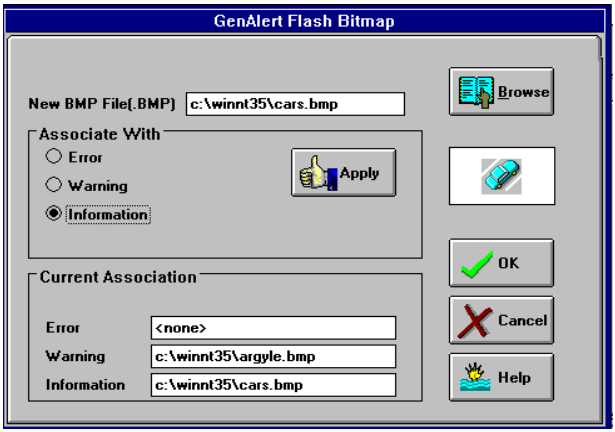
Email

General Alert can be configured to alert you via Microsoft Mail if an error occurs. After configuring Microsoft Mail, click on the toolbar email icon and log on to the email system.

General Alert will send the email message based on the manner in which you configure the alert elements.

Flashing Icons

General Alert can be configured to flash an icon on the screen in response to any alert event. The icon must be in a .BMP format. The size of the icon must be no larger than 32 x 32 pixels. The bitmap configuration screen is shown below.

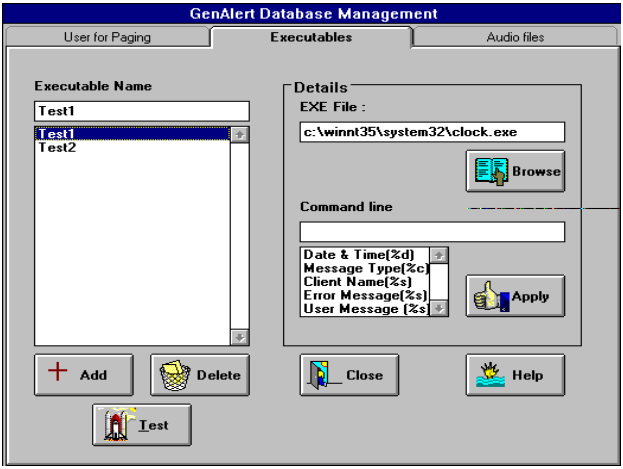


General Alert allows you to select the .BMP file by either entering the path and filename or clicking on Browse. After selecting the .BMP file to be configured, select the type of event to be associated with it and click on Apply.

When more than one of the same event occurs before you acknowledge that event, *Depth* <*n*> appears in the flashing icon (shown below), where *n* is the number of events.

Cont'd

Program Execution General Alert Server can be configured to execute any executable file in response to an event. A sample executable database screen follows:

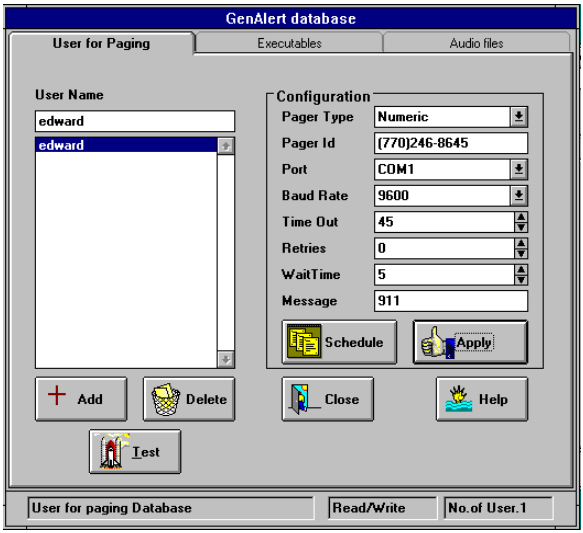


From this screen, you can select the file that General Alert will start. Select the file by either typing the filename or clicking on Browse and choosing the file. After selecting the file to be executed, you must define the command line parameters that invoke the client application program in response to alert events.

The current command line setting is shown in the horizontal box . The possible command line settings are displayed in the vertical box. You can drag and drop or click on Add or Delete to construct the command line parameters. After configuring the executable file, you can make sure it works by clicking on Test.

Cont'd

Pager Notification General Alert supports numeric paging for an event. A sample pager database screen follows:



From this screen, you can associate users to page for specific events. All users currently in the pager database are listed. You can add any user to the database by entering the user name. Click on the Add button to add the user to the list.

The configuration section allows you to set the parameters according to the hardware.

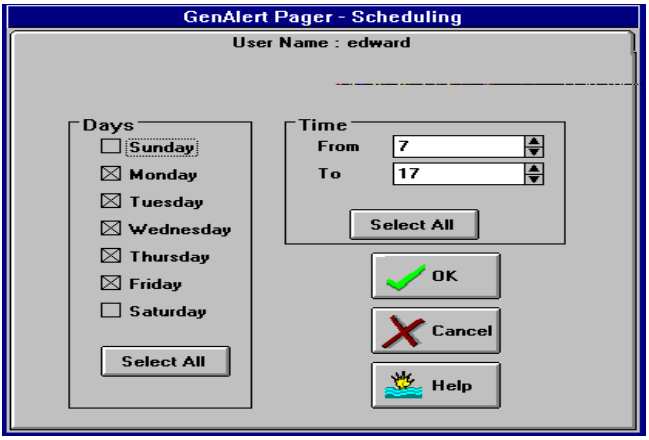
Select the Pager Type in the Pager Type field. Enter the phone number of the pager to be dialed in the Pager ID field.

Select the serial port to be used in the Port field. Select the correct data transfer rate in the Baud Rate field. Select a timeout value in the Time Out field. You can specify the number of times the message is transmitted in case of initial failure in the Retries field. Enter the number of seconds to wait before the pager phone number responds in the Wait Time field. The default values are displayed for all of these fields on the screen shown above. Enter the message to be sent via pager in the Message field.

Cont'd

Scheduling

Pager Notification also includes a scheduling feature. Click on Scheduling to display the Schedule box (shown below). You can configure the days of the week and the time of the day to page each user on this screen.



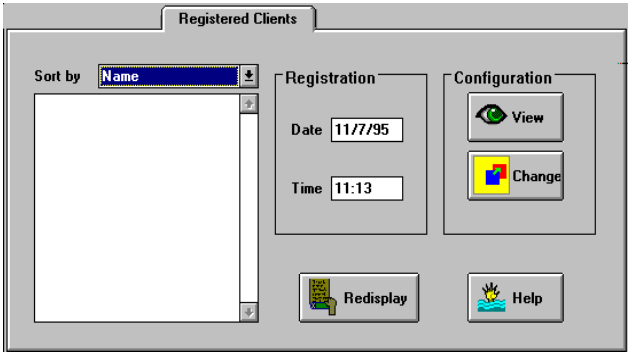
SNMP

General Alert will be able to notify users through SNMP (Simple Network Management Protocol). General Alert supports HP Openview and Novell Management System as well as any other SNMP agent. *This feature is not yet implemented.*

Registering Clients A client application must be registered before it can notify General Alert. A client can be registered by either selecting *Register Clients* from the menu or clicking on the register client icon in the toolbar. A sample Client Name screen follows:

Enter the Client name on this screen. If the name is entered correctly, the event configuration box appears. Client registration can also be done on the clients side using DDE.

Configuring Clients General Alert also permits multiple clients to be configured for a single General Alert server. You can manage multiple clients from the General Alert Client Registration Database. A sample screen follows:



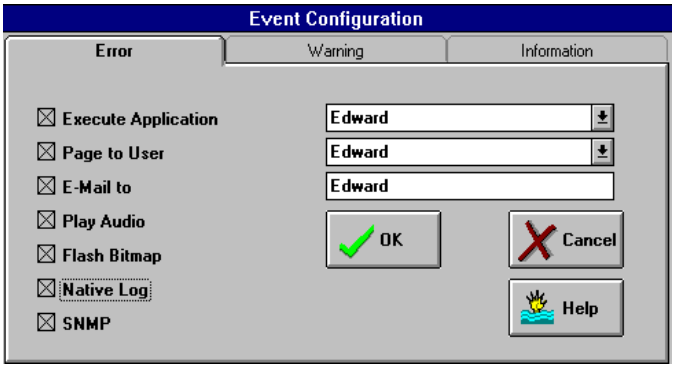
This screen displays all currently registered clients by name, date, and time of registration. Each client can be configured from this screen. The clients can be displayed by name or by date and time.

Cont'd

Configuring Events General Alert allows three levels of event configuration for each of the seven alert mechanisms:

- Error,
- Warning, and
- Information.

You can register any of the seven alert mechanisms in any order for each event. A sample configuration screen follows:



When the client wants to raise an alert, it sends its name, severity type, and a message describing the cause of the event through DDE.

When General Alert receives this message, it searches its database. If the client is registered and configured, General Alert takes proper action. Otherwise, General Alert uses the default configuration.

Cont'd

Activity Palette Make sure the Activity Palette is active. Run the Activity Palette after starting General Alert. The Activity Palette displays a dialog box that appears only when General Alert indicates an error or warning condition.

Use the Activity Palette to acknowledge that you are aware of the error condition. You can turn off the error indicator from the Activity Palette. The Activity Palette is shown below. Click on the appropriate icon to turn off the error notification indicator.

You can configure the alert elements either from the General Alert toolbar or the configuration folder.

Activity Palette Icons The Activity Palette toolbar icons are:

Icon	Description
	Click on this icon to turn off the program that began running when the alarm condition occurred.
	Click on this icon to turn off the SNMP routine that began running when the alarm condition occurred.
	Click on this icon to deactivate the flashing icon that appeared on your screen when the alarm condition occurred. You can also click on the flashing icon to deactivate the alarm indicator.
	Click on this icon to erase the display of the email that appeared when the alarm condition occurred.
	Click on this icon to delete the page that was sent to a pager when the alarm condition occurred.
	Click on this icon to turn off the sound that began playing on your computer speaker when the alarm condition occurred.
	Click on this icon to close the Activity Palette.

4 Configuring Client Software for General Alert

General Alert is the DDE server application. It notifies you of a system problem by:

- broadcasting a failure alert message through a pager,
- executing a program,
- sounding an audible alarm,
- displaying a special icon on the screen,
- executing an SNMP trap*(not yet implemented),*
- sending an email, or
- making an entry in a system log.

The client application sends messages via DDE to General Alert, which actually performs the notification.

DDE

DDE (Dynamic Data Exchange) is a message-based protocol used for sharing information between applications. The clients can communicate with the server through the DDE in Windows NT. The General Alert Server supports SERVICE NAME.

SERVICE NAME consists of GENALERT_SERVER and three topics:

- registration,
- configuration, and
- event.

These topics are defined in the GENDDE.HPP file.

Registration

Registration is the process that registers the user application in the General Alert client database.

Configuration

Choose this option to configure the client application and the General Alert RAID Monitor.

Event

You must establish the action (send an email, broadcast a failure alert message through a pager, run a program, play an audio file, display an icon, etc.) to be associated with events. This is part of the DDE code.

Cont'd

DDE Initialization The DDE client application must be initialized before the client application can communicate through DDE. Initialization is performed by the DDEML function DDEinitialize. A sample call back function is shown below. The first connection is made by the DDEconnect function. The DDEClientTransaction function is called with:

- the transaction type set to POKE,
- the item being set to the client name, and
- the value of the data.

Sample Callback Function

```
1 for Registration and 0 for Unregistration.
Severity (%d)|flags(%d)|email-
addr(%s)|exec(%s)|user(%s) for changing the
configuration severity(%d)|message(%s) for
sending an event.
```

After the above actions have been performed, a disconnection is made using the DDEDisconnect function. See the *Microsoft Windows Programmer's Reference* for more information on DDE programming.

Sample Code

Sample DDE Initialization Code The following code initializes DDE. This code is Microsoft-standard DDE interface code. See the *Microsoft Windows NT Programmer's Reference* for additional information about this code.

```
//do this in winmain to initialize the DDE
# include "windows.h"
#include <DDEml.h>
#include <string.h>
#include<gendde.hpp>
HANDLE hlnst;
HSZ hszService;
HSZ hszTopicReg;
HSZ hszTopicCfg;
HSZ hszTopicEvent;
HSZ hszitem;

DWORD idInstSer = OL;

//DDE callback function declaration
HDDEDATA EXPENTRY_export DDEML Callback
(WORD,WORD,HCONV,HSZ,HSZ,HDDEDATA,DWORD,DWORD);
//for initialization
 FARPROC IpDDEMLProc;
IpDDEMLProc= MakeProcInstance ((FARPROC) DDEML Callback,
hlnstance);
if (!lpDDEMLProc) return FALSE;
if (!DDEInitialize (&idInstSer, (PFNCALLBACK) IpDDEMLProc,
APPCLASS_STANDARD | APPCMD_CLIENTONLY, 0L)

{
hszService = DDECreateStringHandle (idInstSer,
DDE_SERVICE_NAME, CP_WINANSI);
hszTopicReg = DDECreateStringHandle (idInstSer,
DDE_TOPIC_REGISTRATION, CP_WINANSI);
hszTopicCfg = DDECreateStringHandle (idInstSer,
DDE_TOPIC_CONFIGURE, CP_WINANSI);
hszTopicEvent = DDECreateStringHandle (idInstSer,
DDE_TOPIC_EVENT, CP_WINANSI);
hszItem = DDECreateStringHandle (idInstSer, clntNAME,
CP_WINANSI);

}
else
return FALSE;
//sample callback function
HDDEDATA EXPENTRY_export DDEMLCallback
(WORD wType, WORD wFmt, HCONV hconv, HSZ hsz1, HSZ hsz2,
HDDEDATA hData, DWORD dwDATA1, DWORD DWDATA2)
{
switch (wType)
{
case XTYP_ADVDATA;
return DDE_FACK;
CASE XTYP_DISCONNECT:
MessageBox(NULL, "The server has disconnected", Client",
MD_ICONASTERISK|MB_OK);

return NULL;
```

Cont'd

```
default:
return NULL;
}
}
#define DDE_TIMEOUT 3000
// to REGISTER a client:
hConv = DDEConnect (idInstSer, hszservice, hszTopicReg, NULL);
int data = 1;
DDEClientTransaction(&data,sizeof(int), hConv, hszItem,
CF_TEXT,XTYP_POKE, DDE_TIMEOUT, NULL);
DDEDisconnect(hConv);

//to UNREGISTER a client:
hConv = DDEConnect(idInstSer, hszService, hsz TopicReg, Null);
int data = 0;
DDEClientTransaction(&data,sizeof(int), hConv, hszItem,
CF_TEXT,XTYP_POKE, DDE_TIMEOUT, NULL);
DDEDisconnect(hConv);

//to send any event:
int eventType; // should be one of the following
//GEN_CLIENT_ERROR
//GEN_CLIENT_WARNING
//GEN_CLIENT_INFORMATION
hConv = DDEConnect(idInstSer, hszService, hszTopicEvent, NULL);
char buffer[32];
wsprintf(buffer, "%d%cSave Me!!", eventType, GEN_DDE_DELIM);
DDEClientTransaction(buffer, strlen(buffer) +1,hConv,hszItem,
CF_TEXT,XTYP_POKE,DDE_TIMEOUT,NULL);
DDEDisconnect(hConv);

//to change configuration
char buffer[64]
char *eMailaddr;
char *userToPage;
char *ExecutableName;
int eventType; // should be one of the following
//GEN_CLIENT_ERROR
//GEN_CLIENT_WARNING
//GEN_CLIENT_INFORMATION
int actionCode; // should be bit-wise OR-ed of any
GEN_CLIENT-ACTION_** flags, as defined in Gendde.hpp
wsprint( buffer, "%d%c%d%c%s%c%s%c%s",
eventType, GEN_DDE_DELIM,
actionCode, GEN_DDE_DELIM,
eMailAddr, GEN_DDE_DELIM,
ExecutableName, GEN_DDE_DELIM
userToPage);

hConv = DDEConnect(idInstSer,hszService,hszTopicReg,Null);
DDEClientTransaction(buffer, strlen(buffer) +1, hConv, hszItem,
CF_TEXT,XTYP_POKE,DDE_TIMEOUT,NULL);
DDEDisconnect(hConv);
```

GenDDE.HPP

```
#ifndef_GEN_DDE_HPP_
#define_ GEN_DDE_HPP_
#define GEN_DDE_DELIM_ '|'
#define DDE_SERVICE_NAME "GENALERT_SERVER"

#define DDE_TOPIC_REGISTRATION "REGISTRATION"
#define DDE_TOPIC_CONFIGURE "CONFIGURATION"
#define DDE_TOPIC_EVENT "EVENT"

/* only poke is entertained */
/* item name always identifies the client*/
/*

 for DDE_TOPIC_REGISTRATION data = 0 -- unregister
 = 1 -- register

 for DDE_TOPIC_CONFIGURE data identifies the configuration in
the following format
 severity(%d) : flags(%d) : email-addr(%s): exec(%s): user(%s)

 for DDE_TOPIC_EVENT data describes the event in the following
format severity(%d) : message(%s)

*/

#define GEN_CLIENT_ERROR 1
#define GEN_CLIENT_WARNING 2
#define GEN_CLIENT_INFORMATION 3

//action flags
#define GEN_CLIENT_ACTION_PAGE 0x01
#define GEN_CLIENT_ACTION_EXEC 0x02
#define GEN_CLIENT_ACTION_EMAIL 0x04
#define GEN_CLIENT_ACTION_AUDIO 0x08
#define GEN_CLIENT_ACTION_ICON 0x010
#define GEN_CLIENT_ACTION_SNMP 0x020
#define GEN_CLIENT_ACTION_NATIVE 0x080

#endif
```

A MegaRAID Monitor Messages

MegaRAID Monitor displays a message when any MegaRAID state change occurs.

Message Types The types of MegaRAID Monitor messages include:

- physical drive state changes,
- logical drive state changes,
- the physical drive at startup is in REBUILD state, or
- the logical drive at startup is not in Optimal state.

Message Prefixes MegaRAID Monitor messages are preceded by one of the following terms, which indicates the severity of the message:

- information,
- warning, or
- severe.

Cont'd

Sample MegaRAID Monitor Messages

Sample Message	Explanation
Sample physical drive state message	
MegaRAID-1 (2:4) State ONLINE to FAILED If the new state is ONLINE, the message prefix is *Information.* If the new state is any other state, the message prefix is *Warning.*	The state of the device at Adapter 1, Channel 2, Target 4 has changed from ONLINE to FAILED. The valid physical drive states are: READY, ONLINE, FAILED, REBUILD, and HOTSPARE
Sample logical drive state message	
MegaRAID-1 LD-2 State OPTIMAL to DEGRADED If the new state is ONLINE, the message prefix is *Severe.* If the new state is OPTIMAL or went from OFFLINE to DEGRADED, the message prefix is *Information.* If the state changed from OPTIMAL to DEGRADED, the message prefix is *Warning.*	The state of logical drive 2 at adapter 1 has changed from OPTIMAL to DEGRADED. The valid logical drive states are: OFFLINE, DEGRADED, and OPTIMAL.
Sample physical drive at startup is in REBUILD state message	
MegaRAID-1 (2:4) at startup is in REBUILD state This message always has a WARNING prefix.	Adapter 1 Channel 2, Target 4 is in the REBUILD state.
Sample logical drive at startup is not in OPTIMAL state message	
MegaRAID-1 LD-2 AT STARTUP IS DEGRADED This message always has a WARNING prefix.	The state of logical drive 2 at adapter 1 is DEGRADED.

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